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# **IEA Greenhouse Gas Programme's work on legal and regulatory frameworks**

*by Paul Freund*

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# Legal and regulatory frameworks

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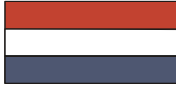

















## *Overview*

- Introduction to IEA GHG
  - Capture and storage of CO<sub>2</sub>
  - Issues arising from the capture installation
  - Issues arising from the storage installation
  - Conclusions
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# IEA Greenhouse Gas R&D Programme



	<b><i>Australia</i></b>		<b><i>Netherlands</i></b>
	<b><i>Canada</i></b>		<b><i>New Zealand</i></b>
	<b><i>CEC</i></b>		<b><i>Norway</i></b>
	<b><i>Denmark</i></b>		<b><i>Sweden</i></b>
	<b><i>Finland</i></b>		<b><i>Switzerland</i></b>
	<b><i>France</i></b>		<b><i>UK</i></b>
	<b><i>India</i></b>		<b><i>USA</i></b>
	<b><i>Japan</i></b>		<b><i>Venezuela</i></b>
	<b><i>Korea</i></b>		

**Sponsors: Alstom Power Technology, BP, ChevronTexaco, EniTecnologie SpA, EPRI, ExxonMobil, RWE AG, Shell International, Total**

# IEA GHG Strategy

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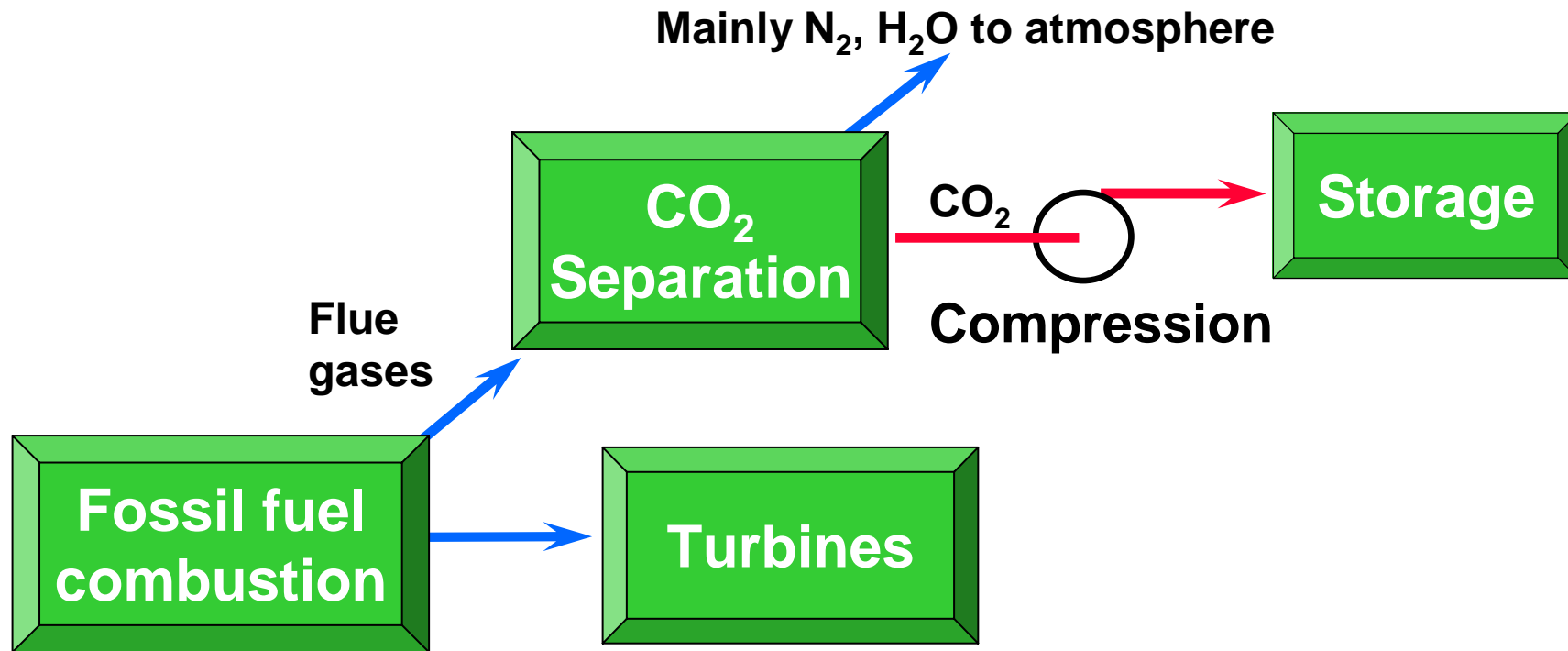


## *Role*

- The IEA Greenhouse Gas R&D Programme is an objective source of information on technologies capable of achieving deep reductions in greenhouse gas emissions
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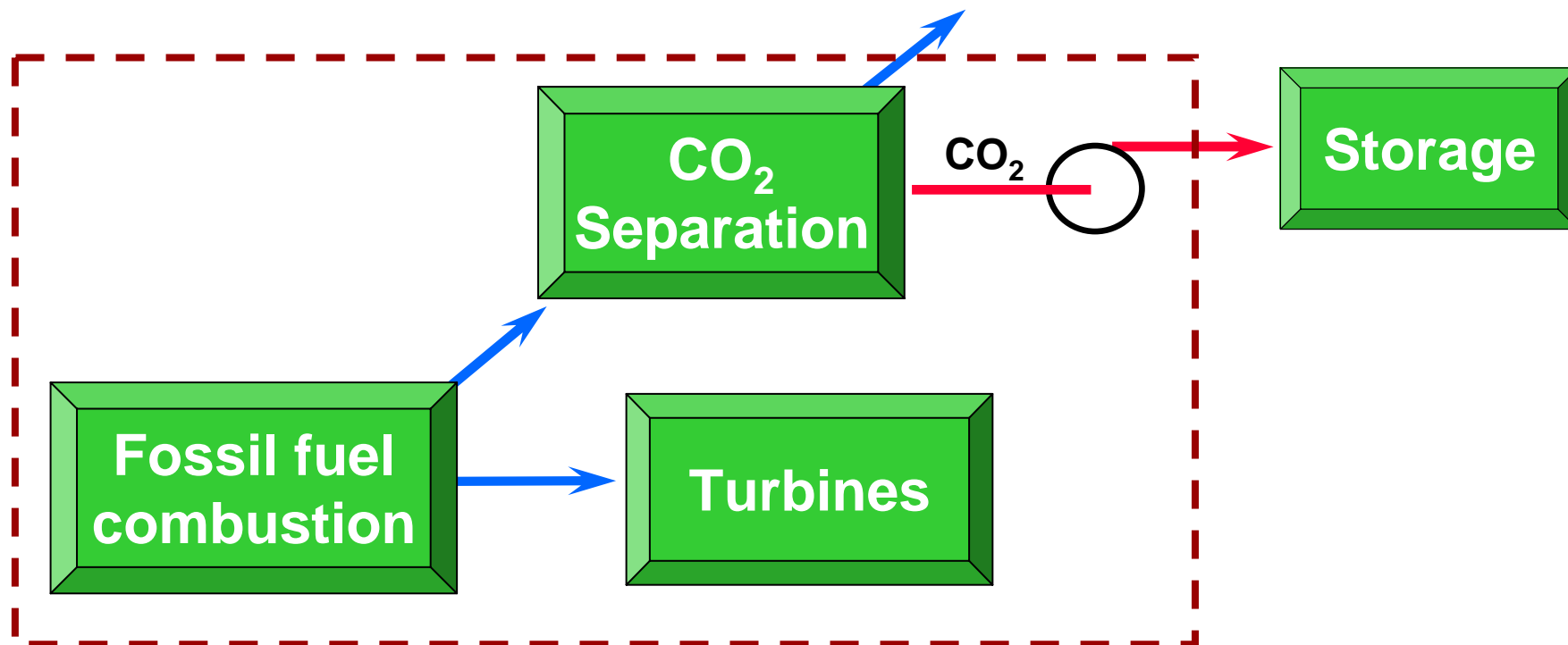
# Capture & Storage of CO<sub>2</sub>

*Example: power generation*



# Capture & Storage of CO<sub>2</sub>

*Power plant installation with CO<sub>2</sub> capture*



# Regulatory Issues

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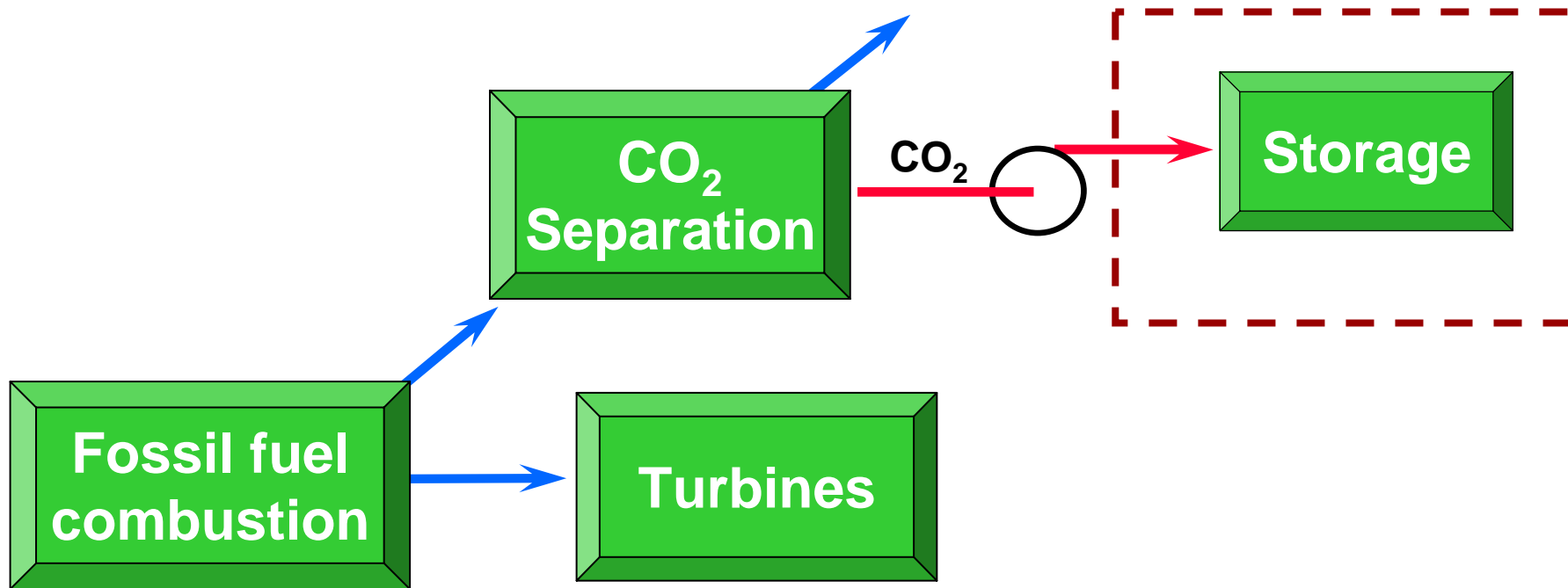
## *For an installation with CO<sub>2</sub> Capture*

- Short to medium term issues
  - Planning
  - Health and safety
  - Emissions
  - Emissions trading
- National or regional regulations cover most of these issues
  - Emissions trading is not yet adequately addressed



# Capture & Storage of CO<sub>2</sub>

## *Transmission & Storage of CO<sub>2</sub>*



# Regulatory Framework

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## *CO<sub>2</sub> Transmission and Storage*

- Short to medium term issues
  - Planning
  - Health and safety
  - Emissions
  - Emissions trading
- Long and very-long term issues
  - Potential effects of leakage
    - ◆ On achieving climate change mitigation goals
    - ◆ On health, safety and environment (In situ liability)



# Liabilities

## *Transmission and Storage*



	<b>Operational</b>	<b>Climate</b>	<b>In situ</b>
<b><i>Short</i></b>			
<b><i>Medium</i></b>			
<b><i>Long</i></b>			
<b><i>Very long</i></b>			

# Developing long-term Framework

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## *CO<sub>2</sub> Transmission and Storage*

- National or international jurisdiction?

### *National and regional laws*

- Various regulations will be relevant, e.g.
    - Mining
    - Waste disposal
    - Drinking water
    - Pipelines
  - Analysis of existing regulations in N. America, Europe, Japan and Australia highlights lack of regulations specifically addressing CO<sub>2</sub> storage
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# Developing long-term Framework

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## *CO<sub>2</sub> Storage*

- In developing regulations, will need to recognise trade-off between costs of
    - Site selection & characterisation
    - Long-term liability
  - Accounting for CO<sub>2</sub> in the reservoir
    - Initially isolated mass of CO<sub>2</sub>
      - ◆ Subsequent movement possible – what should be done if it mixes with other stored CO<sub>2</sub>?
      - ◆ What will be required for accounting in the long-term?
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# Developing long-term Framework

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## *CO<sub>2</sub> Storage*

- Accounting for CO<sub>2</sub> (continued)
    - Monitoring
      - ◆ Provides baseline
      - ◆ Needed for confirmation of integrity, for public confidence, as well as for accounting
      - ◆ How long should it continue and in what form?
      - ◆ Data provides basis for penalty if CO<sub>2</sub> escapes
    - Regulation may have to distinguish between acceptable and unacceptable behaviour
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# Developing long-term Framework

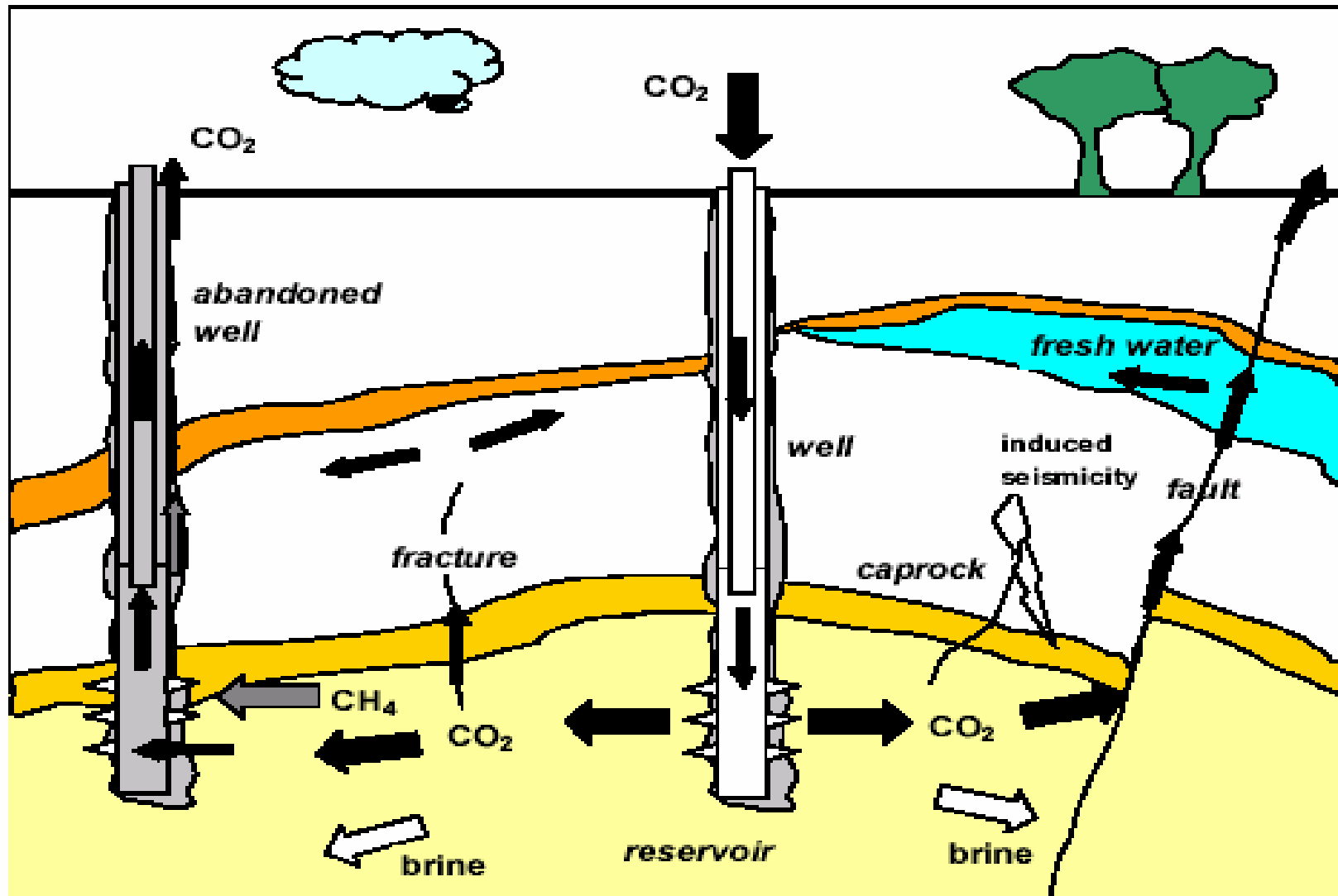
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## *CO<sub>2</sub> Storage*

- Accounting for CO<sub>2</sub> (continued)
    - Record-keeping needed for
      - ◆ Assessment of royalties and/or dues, determination of rights, avoidance of inadvertent disturbance.
    - Issues to consider include
      - ◆ Type of information, format, protection, duration of retention
      - ◆ Responsible organisation
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# Security of storage



(After Damen et al 2003)

# Developing long-term Framework

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## *CO<sub>2</sub> Storage*

- Storage and well design
    - ◆ Well-bore is one of the main potential escape routes
    - ◆ Safety case will include drilling and completion practices, quality of the operator, materials used
    - ◆ Regulation will also consider number and age of wells, possible geochemical changes, fluid pathways in event of leakage, nature of leakage.
    - ◆ Extent of over-pressure and duration
    - ◆ CO<sub>2</sub> migration processes and pathways
  - Regulatory authorities likely to require evidence and/or models to support the case.
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# Developing long-term Framework

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## *Sub-surface Property Rights*

- Ownership of rights to sub-surface
  - Royalty for use of the reservoir
  - Compensation for sterilisation of reservoir
  - Compensation for cost and exposure to liability
- Who owns the CO<sub>2</sub> stored underground?
- Could the rights to pore space be transferred to another party?

## *Conclusion for national law*

- Several issues yet to be addressed
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# International Law

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## *General principles*

- States exercise sovereignty in their territories
- States have responsibility to ensure that activities within their jurisdiction do not cause trans-boundary impacts

***Implemented through national legislation***

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# International Agreements

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## *CO<sub>2</sub> storage*

- Agreements having implications for CO<sub>2</sub> storage
    - Global agreements
      - ◆ London Convention and '96 Protocol
      - ◆ Basel Convention
      - ◆ Convention on Biological Diversity (CBD)
    - Regional agreements
      - ◆ OSPAR
      - ◆ Helsinki Convention
      - ◆ Other regional conventions and agreements
  - Appear to apply in the sea & beneath the seabed
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# London Convention and Protocol

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## *The London Convention*

- Regulates dumping of wastes at sea

## *'96 Protocol*

- Also applies to the “subsoil”
  - Controls dumping of materials except those on the “reverse list”
    - CO<sub>2</sub> is not on the “reverse list”
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# London Convention and Protocol

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## *Shore-based pipelines*

- The Protocol does not specifically cover material pipelined from land-based sources
  - However, **disposal** from “*other man-made structures at sea*” is prohibited
  - This may affect shore-based pipelines.
  - **Placement** from offshore activities not prohibited
  - **Dumping** excludes “*placement of matter for a purpose other than the mere disposal thereof*”
    - This would appear to permit CO<sub>2</sub>-EOR
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# Basel Convention

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- Aims to enhance control of trans-boundary movement of wastes
  - States of import and transit have to give consent prior to movement
  - Movement of wastes from OECD to non-OECD countries for disposal, recovery and recycling is prohibited
  - There is no indication that captured CO<sub>2</sub> would be defined as waste under the Convention
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# Convention on Biodiversity

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- Geological storage may affect biological diversity underground
  - Parties would seem to be obliged to:
    - Identify components of biodiversity
    - Identify processes and activities that are likely to have significant adverse impacts
    - Monitor their effects
  - Discussions proceeding
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# Regional Conventions

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- Many regional conventions have been developed through the UNEP Regional Sea Programme
- The most significant is OSPAR, which covers the North East Atlantic
- Helsinki Convention covering the Baltic includes similar restrictions



# OSPAR

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- Covers the sea-bed and hydrosphere
  - CO<sub>2</sub> injection from land-based pipelines appears to be permitted
  - Injection of CO<sub>2</sub> captured on land from vessels and platforms is prohibited
  - OSPAR is reviewing the status of CO<sub>2</sub> storage
    - A report has been prepared by the Group of Jurists and Linguists
  - The acceptability of CO<sub>2</sub> storage depends on the method & purpose of placement not on its effect on the marine environment
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# Conclusions

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## *Issues for long-term framework:*

- What are the timeframes for CO<sub>2</sub> storage?
  - Who will control and pay for ongoing monitoring?
  - Will the liability for stored CO<sub>2</sub> become a public liability?
  - Sub-surface property rights need to be clarified
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# Conclusions

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- Some national and international laws and conventions will restrict CO<sub>2</sub> storage
    - Not designed with CO<sub>2</sub> storage in mind
  - There are significant ambiguities in existing conventions and laws regarding CO<sub>2</sub> storage
  - The “precautionary principle” may apply
  - Further discussion and clarification are needed
  - The need to reduce emissions of CO<sub>2</sub> to the atmosphere should be taken into account in such discussions
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